National Institute of Environmental Health Sciences

Evaluation of a wildfire smoke forecasting system as a tool for public health protection

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Abstract:

Background: Exposure to wildfire smoke has been associated with cardiopulmonary health impacts. Climate change will increase the severity and frequency of smoke events, suggesting a need for enhanced public health protection. Forecasts of smoke exposure can facilitate public health responses. Objectives: We evaluated the utility of a wildfire smoke forecasting system (BlueSky) for public health protection by comparing its forecasts with observations and assessing their associations with population-level indicators of respiratory health in British Columbia, Canada. Methods: We compared BlueSky PM2.5 forecasts with PM2.5 measurements from air quality monitors, and BlueSky smoke plume forecasts with plume tracings from National Oceanic and Atmospheric Administration Hazard Mapping System remote sensing data. Daily counts of the asthma drug salbutamol sulfate dispensations and asthma-related physician visits were aggregated for each geographic local health area (LHA). Daily continuous measures of PM2.5 and binary measures of smoke plume presence, either forecasted or observed, were assigned to each LHA. Poisson regression was used to estimate the association between exposure measures and health indicators. Results: We found modest agreement between forecasts and observations, which was improved during intense fire periods. A 30-μg/m3 increase in BlueSky PM2.5 was associated with an 8% increase in salbutamol dispensations and a 5% increase in asthma-related physician visits. BlueSky plume coverage was associated with 5% and 6% increases in the two health indicators, respectively. The effects were similar for observed smoke, and generally stronger in very smoky areas. Conclusions: BlueSky forecasts showed modest agreement with retrospective measures of smoke and were predictive of respiratory health indicators, suggesting they can provide useful information for public health protection.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3801470

Resource Description

Early Warning System: ☑

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☑

weather or climate related pathway by which climate change affects health

Air Pollution, Extreme Weather Event

Air Pollution: Particulate Matter

Extreme Weather Event: Wildfires

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Non-U.S. North America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Respiratory Effect

Respiratory Effect: Asthma

Intervention: ☑

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Methodology

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified